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## FARM ANIMALS.

*Cyclopedia of American Agriculture.* A Popular Survey of Agricultural Conditions, Practices, and Ideals in the United States and Canada. Edited by L. H. Bailey. Vol. iii., Animals. Pp. xvi+708. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1908.) Price 21s. net.

THE third volume of this important "Cyclopedia of Agriculture"—the volume dealing with animals—reflects in a remarkable manner the varying standards to which agricultural knowledge has attained in individual sections of the subject. In the sections hitherto most amenable to experiment and research a vast amount of information of an accurate and trustworthy character has been accumulated. Much of this information may be beyond the farmer's capacity to utilise; some of it may have been developed on lines which were not always as useful as the experimenters expected and claimed; but time and experience always tend to bring the experimenter in the laboratory and the operator in the field into closer and closer touch, and so to rub off the eccentricities of each. On the other hand, in the sections concerned with breeding and selection, and with the evolution of different types of stock, our knowledge is still in a very nebulous condition, even though in these sections agriculturists have operated with, perhaps, the greatest apparent success. In dealing with such subjects, writers are still too apt to lay the foundations of their work in unquestioned beliefs and unsubstantiated opinions. Such expressions as "it is supposed," "it is believed," "it is said," "it has been thought," appear in this volume, as in most other books upon the same subject, with too great frequency. It is unfortunate that, instead of emulating the patience and thoroughness of such authors as Youatt and Low, our recent writers on live stock have taken to a style that may be descriptively interesting, but is often inaccurate, sometimes even slipshod, and leads to no abiding result.

The editor of this encyclopædia realises the unsatisfactory nature of this part of the work compared with the other part based upon long-continued experiment and research, and his words are well worth quoting:—

"Contrary to his expectation, the editor has found the compilation of this volume much more difficult than the making of the volume on crops. Animals are less tractable to investigate than plants, and the scientific method does not seem to have been so successfully applied to the study of them as to crops. In the matter of breeds, the expert knowledge is likely to be in possession of advocates or even of partisans, and it is very difficult to arrive at agreement or a common basis of comparison and judgment. Existing writings are largely descriptive and historical. Even on questions of feeding and general management, there are almost irreconcilable differences of opinion. The editor hopes, however, that the compilation has brought together the soundest

opinions and practices, and he is sure that the names of the contributors to this volume will make the work authoritative. The articles on breeds are largely from men engaged in practice and from specialists in the breed, whereas the articles on crops in vol. ii. are largely from teachers and investigators; this dissimilarity is representative of the kinds of interest that attach to these two groups of agricultural produce."

It would be almost impossible to overestimate the value of the real scientific part of this volume, such, for instance, as Armsby's chapter on the principles of stock-feeding; the complementary chapters on balancing rations, and the whole section dealing with the manufacture of animal products, in which milk, butter, cheese, meat, and even such things as hides and leather are dealt with. There are very useful and carefully written chapters on the physiology of domestic animals, on infectious diseases of animals, and on the American invention of scoring-cards in stock-judging.

The greater part of the work is taken up with a description of North American farm animals, their breeding, history, rearing, and general treatment towards accomplishing the ends for which they are intended. This part must be useful to a very large number of people, for it treats not only of horses, cattle, sheep, and swine, but of dogs, goats, fish, poultry, reindeer, and bison, and even of pigeons, rabbits, cage-birds, and many other domestic pets.

It is only in the parts of the book dealing with the science of breeding and in the descriptions of individual breeds that we would suggest amendments. In so important a "Cyclopedia" as this, one expects the writers on breeding and heredity to go beyond the Darwinian position and discuss the illumination which the work of such men as Weismann, De Vries, and Mendel has afforded. One also expects doubtful theories to be well sifted. For instance, a reconstructed *Urus* is labelled "*Urus*, the source of domestic cattle." The question is no doubt encompassed by many difficulties, but it would be just about as easy to prove that the quagga is the source of domestic horses.

Perhaps the best way to indicate the kind of statement to be found running through the breed descriptions is to throw a few of them into the form of interrogations while retaining the writers' language as far as possible, viz.:—

Did Hugh Watson declare himself for the "Black and all black; the Angus Doddie, and no surrender"? Is Angushire now a part of Forfarshire? Did Watson's ancestors breed Angus cattle on the Keillor farm for more than two hundred years before 1805? Did Hugh Watson begin to breed Angus cattle in 1805? Are there Devon cattle in Ireland? Is the Galloway the oldest of the pure breeds of Britain? Is the Hereford among the oldest, if not the oldest, established of the English breeds of domestic cattle? Have Suffolk or polled cattle existed in the county of Suffolk, England, from time immemorial, and does the probability seem to be that they were introduced soon after the Roman occupation? Is the supposition correct that a Mr.

Dexter developed the Dexter breed of cattle by crossing the true Kerries on cattle of a beefy sort, possibly Shorthorns? Was the cow called *Red Rose* which produced nearly 10,000 lb. of milk in a year a true Kerry? Is the cow figured on p. 380 as a Dexter-Kerry really a Dexter-Kerry? Is the outcome of the cross of Shorthorn bulls on Galloway cows usually a blue-grey? Did the monks of the Middle Ages have the Cheviot breed of sheep about the pasture-lands of the old monasteries? Did George Washington have Bakewell ewes at Mount Vernon, or is it only "said"? Do black-faced sheep subsist largely on heather?

The answers to some of these questions may be in the affirmative, but they need support before being accepted.

There are two breeds of cattle peculiar to America, viz. the polled Durhams and the polled Herefords, about the origin of which one would like to have definite information. In both these breeds there are what are called "double standards" and "single standards": the "double standard" animals being pure-bred hornless sports and their descendants, and the "single standards," in the case of the Hereford, being animals "not eligible to record in the American Hereford Record," and, in the case of the Shorthorns, animals "got by the use of Shorthorn bulls on the native muley cows." We never hear of hornless sports among pure-bred Herefords or Shorthorns in Britain, and some information as to the circumstances in which these occur in America would be not only interesting, but useful to students of heredity.

JAMES WILSON.

#### POWER GAS PRODUCTION.

*Power Gas Producers, their Design and Application.*

By Philip W. Robson. Pp. iv+247. (London: E. Arnold, 1908.) Price 10s. 6d. net.

THE wonderful advance in the production of power made by the suction gas plant combined with the gas engine gives great importance to any trustworthy literature on the subject, and the work on power gas producers by Mr. P. W. Robson is certainly one which will be warmly welcomed, as it sets the subject out in a clear and concise manner, and indicates the theory of the various actions, as well as the means by which the application is carried out.

As the author very fairly admits, it is difficult for one engaged in the manufacture of a particular class of producer to treat thoroughly of the work of other firms, with the result that perhaps full justice has not been done in every case; but as a whole the book is wonderfully free from error, although there are a few points which might be amended.

The statement made on p. 17 that anthracite and gas coke have practically the same proportion of volatile matter is a little loose, as with a good gas coke one does not expect to find more than 1 per cent., whilst the average in anthracite is about 5 per cent. to 6 per cent. On p. 29 the reader is left to infer that, inasmuch as a temperature of 900° C. to

1000° C. favours the formation of carbon monoxide rather than the dioxide, it is the best to employ, whilst practical conditions undoubtedly dictate a lower temperature in order to avoid the tendency to clinker which is so often found with fuels that are not of quite the best quality. Indeed, some of the largest producer makers hold that a temperature between 800° C. and 900° C. is the best for practical working.

In the conclusion to this chapter, also, the statement that an excessive amount of steam lowers the temperature all round and is generally against efficiency, preventing the production of a good gas, is of course modified by the fact that within a fairly wide range increase of carbon dioxide almost invariably means a corresponding increase of hydrogen, and if this were not so it is quite clear that such processes as the Mond would not be possible, whilst the advantage of an excess of steam over the theoretical quantity is in reduction of clinker and ensuring free combustion of that portion of the carbon which otherwise remains in the ash.

In chapter iii. the statement is made that the regulation of the steam is unnecessary, and in producers of the "National" type this may be the case, as it would be very difficult indeed to regulate a water feed which has to distribute over half a dozen places, but with other forms of producer it is certain that if a less saturation of the air is arranged for low loads and is increased in an increasing ratio at full loads, a more uniform temperature is maintained in the generator.

On p. 46 indicator diagrams are shown of the National and Crossley engines as illustrating conclusively that the gas produced with excess of steam could not have been of such high calorific value as that evolved in the National type of producer, but the author has evidently overlooked the fact that in the trial here quoted the National engine was taking full gas, whilst the Crossley engine had the gas charge throttled so as to keep within the limits of power of the trial.

It is stated on p. 71 that the temperature of the gas entering the cooling or coke scrubber should be 600° F., but this temperature would be with ordinary plants far too high, and would be taken as showing that in the form of vapouriser used the heat was not properly extracted.

The author mentions on p. 106 that some French makers have introduced a chemical purifier containing oxide of iron for the purpose of eliminating sulphuretted hydrogen from the gas, but surely it is unnecessary to give credit for what has been done in every gas works for very many years.

On the last line but one of p. 84 "per hour" should be inserted after "7½ gallons," whilst in the table on p. 136 the higher value of the heat efficiency for the whole run should be 80 per cent. instead of 8 per cent., and there is a misprint on the third line from the bottom of p. 221.

The portions of Mr. Robson's work which deal with bituminous gas plants are not nearly so good as those portions that have reference to the use of anthracite and coke, whilst the chapters on work